

Space News Roundup

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National Aeronautics and Space Administration



Associate Director Dr. Carolyn Huntoon accepts a painting on behalf of JSC from artist Laurie Whitehead during ceremonies June 25. The 35" by 42" watercolor, titled "and Touched the Face of God," was presented by the Bay Area Executive Club in memory of the *Challenger Seven*.

Hurricane Bonnie underscores JSC severe weather planning

Although a minor storm by the standards of Carla or Camille, Hurricane Bonnie's approach toward the Texas Gulf Coast last week underscored JSC's continued efforts to be ready in the event of severe weather.

The Center declared a Level II state of preparedness at 11:15 a.m. June 25 when Bonnie, then headed directly toward Galveston, was upgraded from a tropical storm to a hurricane.

The Center stays at a Level I condition throughout hurricane season, goes to Level II when severe weather threatens, and then into Level III if a hurricane takes direct aim at the Houston area, said Grady McCright, Deputy Director of Center Operations.

In essence, Level I is a continuing activity, where all managers and personnel assigned to hurricane and severe weather planning are required to review and prepare plans for seeing the Center through a bad storm.

At Level II, initiated by the Director of Center Operations when there is a high probability of severe weather, teams fan out across the Center and begin the several-hour job of safeing computer systems, strapping down trash can lids, sandbagging manhole covers and pulling the park benches in. During Level II, a Hurricane Command Post is activated in the Bldg. 30 Action Center and a hurricane rideout team is assembled.

A rideout team staffed the command post throughout the night of

June 25-26 as Bonnie approached, McCright said, although it was clear by around 4 a.m. that the storm was moving toward landfall east of Houston.

Level III is the highest state of readiness and also is a condition declared by the Director of Center Ops. During this phase, the Center Director has the authority to close the site and evacuate all non-essential personnel.

JSC Aircraft Operations at Ellington Field reacted to the approaching storm Wednesday by evacuating nine T-38s and one Shuttle Training Aircraft (STA). The planes departed for Sheppard Air Force Base in Wichita Falls and Kelly Air Force Base in San Antonio. The two other STAs, as well as the Super Guppy, were already at El Paso, where they normally are stationed. The remainder of JSC's 26 T-38s were either in the hangar at Ellington for maintenance or already deployed to other locations. The KC-135 "zero-g" aircraft was at Tinker AFB, Okla., for maintenance, and the RB-57F high altitude research aircraft rode out the alert in a hangar at Ellington.

Meanwhile, the Center activated ten teams to safe facilities in nine different zones on site and also at Ellington. The teams secure such potentially lethal objects as park benches, newspaper vending machines and manhole covers and generally check to make sure that their zones are ready for high winds.

Another important element of the

(Continued on page 4)

Crippen to head management study group

Navy Capt. Robert Crippen, Deputy Director of Flight Crew Operations at JSC, will head a small group which will examine the overall Space Shuttle program management structure.

The appointment was announced June 11 by NASA Administrator James Fletcher and Associate Administrator for Space Flight Rear Admiral Richard H. Truly during their testimony before the House Committee on Science and Technology.

Crippen's group will review the findings and conclusions of the Rogers Commission which led to that body's recommendations on

the Shuttle Program's management structure. The group also will look at the suggestion that astronauts participate more closely with management decisions, on the creation of a Shuttle safety panel and on improving communications within the Shuttle program.

"Captain Crippen, a veteran of four Shuttle flights, is extremely well qualified to lead this project by virtue of his extensive experience in several NASA programs, including the Shuttle," Truly said. "His intimate involvement in the NASA task force supporting the Rogers investigation of the *Challenger* accident provides significant insight

into all of the Commission's findings and recommendations."

Crippen also is serving as the Vice Chairman of the 51-L Data and Design Analysis Task Force. J. R. Thompson, the original Task Force Vice Chairman in charge of day-to-day operations, returned to his post at Princeton University after release of the Rogers Commission report. The Task Force will continue to support the current Congressional investigations into the accident, Truly said, but will be disbanded as soon as is possible after completion of the Congressional support.

Crippen's group, Truly said, will work closely with the team being

headed by Gen. Sam Phillips, who was Associate Administrator for Manned Space Flight during the Apollo era. "Dr. Fletcher has asked General Phillips to review all aspects of NASA program management," Truly said, "and this internal Shuttle overview (by the Crippen group) will be accomplished in close coordination with General Phillips."

The study headed by Phillips, Fletcher said, "will examine every aspect of how NASA manages its programs, including relationships between our various space centers and NASA Headquarters." The review, he said, "is not limited to the *Challenger* accident and operates with broad authority, from me,

to question every aspect of our activities. The review and report to me is being done without a deadline and will probably take the rest of this year for completion."

Crippen's group, on the other hand, will be focusing primarily on Shuttle program management, examining organizational lines of authority and suggesting solutions to some of the communications problems pointed out by the Rogers Commission.

Part of the review process will entail discussions with current and former NASA managers. Other members of Crippen's group will be announced later.

Demand high for Commission report

Some 12 dozen copies of the Rogers Commission report have already been sold at the GPO Bookstore on the Gulf Freeway and the demand is still high, according to LaRue Welch, manager of the bookstore. "We have barely been able to keep up with the demand, but more copies are on order," she said. The local Government Printing Office bookstore, one of 24 in the country, has gone through two shipments so far and expects another two shipments, totaling an additional 210 copies, to be available in the next two weeks. "I have to assume that the demand is probably higher here than at just about any other bookstore in the country," Welch said. Around 30,000 copies of the report were printed by the GPO in Washington, and the store here intends to keep ordering copies as long as the demand and the supply lasts. Welch said interested persons should come by the store and place their name on a list to receive a copy. The price is \$18, whether mailed or picked up in person. The bookstore is located at 9319 Gulf Freeway at the Hobby Airport exit. The bookstore also features a wide variety of NASA publications and posters. Copies of the Commission report, formally known as "The Report of the Presidential Commission on the Space Shuttle Accident" (GPO number 040-000-00496-3) may also be obtained by writing the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 or by calling (202) 783-3238.

JSC, UH-CL form institute

JSC and the University of Houston-Clear Lake have formed a new cooperative institute to apply computer science research to existing space transportation needs.

The new Research Institute for Computing and Information Systems (RICIS) will provide UH-CL with up to \$2.8 million annually for three years for research conducted through RICIS.

Robert McDonald of the Mission Support Directorate and the JSC coordinator for RICIS said the agreement was a step beyond a grant in that both JSC and the university will jointly oversee the institute's activities. McDonald said JSC will have access to the new institute, and other NASA centers may use the facility as well.

Jack Garman, Deputy Director of Mission Support and a key person

in the formation of RICIS, described the need for the institute: "Software is a pretty hefty foundation of what we do here, and the center really hasn't had any research in that area. We've historically been an operational center, not a research center."

"RICIS will show us how software should be built. The difference between computer science and computer applications is like the difference between science and engineering. We hope RICIS will show us how to apply research to solving real problems," Garman said.

McDonald said the groundwork for RICIS was laid over 18 months ago, and the institute began operations May 15. JSC has had a history of involvement with UH-CL, and JSC is already networked with UH-CL's computing facilities. But

Garman said the new agreement should allow growth in the number of terminals at UH-CL which are linked to JSC.

Some of the planned activities for the institute include education and training in the Ada programming language and using an information system to assist space commercialization efforts. McDonald said the Ada training will include seminars for managers concerning the language selection for use onboard the Space Station and in-depth training for programmers. This effort will involve both NASA and contractor personnel.

A model of the commercial space market is provided through a data base with information concerning the technical, legislative and economic aspects of the business

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Space News Briefs

Lewis takes delivery on CRAY X-MP

Predicting what happens to newly-designed aircraft engines, prior to their manufacture, is just one of the many complex functions performed by the newest super computer at NASA's Lewis Research Center. The CRAY X-MP was installed recently to assist Lewis scientists and engineers in wide-ranging research efforts. One such effort is developing mathematical models of jet engines and their components, including the study of air flow through inlet ducts, compressor turbine blades and exhaust nozzles. Modeling of combustion processes in aircraft engines and mechanical parts for indications of stress on bearings and turbine blades also is being performed with this super computer. "A typical solution on the CRAY X-MP might take 1 hour, while the same solution would take 200 hours on a popular business mainframe computer," said Lewis' Dr. Allan R. Bishop. Solutions to research problems, thought virtually impossible just 10 years ago, are being provided routinely by CRAY X-MP, he said.

Bulletin Board

Program to explore human role in space

The impact of spaceflight on humanity—and vice versa—will be the topic of a one-day program July 19 in Bldg. 2, Room 135. The program, "Space and the Human Dilemma," is sponsored by the Texas Committee of the Humanities, the University of Houston-Clear Lake, the Houston Chapter of the American Institute of Aeronautics and Astronautics and JSC. The program will address the historical, social and ethical impacts of the space program and the human values which influence and have been influenced by space technology. Also on the program is a discussion which is close to home—how has the presence of JSC and the space program affected Houston and the Bay Area? Speakers will include former Astronaut Gerald P. Carr, Space Foundation President William Urban, journalist Alcestis (Cookie) Oberg and UH history professor Dr. Roger Bilstein. The program registration fee is \$3, which should be sent to the University of Houston-Clear Lake Professional Development Office by July 15. Registration also will be conducted from 8:30 to 9 a.m. the morning of the program. For more information, call 488-9320.

BAPCO to meet July 15

BAPCO—the Bay Area PC Organization—will hold its next monthly meeting July 15 at the Holiday Inn on NASA Road 1. BAPCO is a microcomputer users group whose members share a common interest in IBM PCs and compatibles. For more information, call Jack Calvin at 326-2354, or Earl Rubenstein at x3501.

Red Cross to offer classes in July

The Greater Houston Area Chapter of the American Red Cross will sponsor several classes in July, all of which are offered at the Clear Lake Service Center, 18301 A Egret Bay Blvd. The classes include CPR, first aid and disaster emergency survival. For more information, call the Red Cross office at 333-9700.

Security stresses traffic safety

Although new stoplights at the intersections of Second Street and Avenues D and C will help improve the flow of traffic on site, the Security Branch is reminding employees the summer season brings a substantial increase in tourist-related driving at JSC. "Drivers should adhere to posted speed limits and not pass vehicles stopped at pedestrian crosswalks," said Guy Marsella of Security. "Drivers should yield to all pedestrians in a crosswalk. At the same time, pedestrians should be careful not to suddenly step off a curb or cross a street outside of designated crosswalks." Marsella said the summer season also brings with it an increased risk of theft. "We can expect a growth in the attempts to steal personal items left in vehicles, as well as attempts to steal the vehicles themselves. Employees should put valuables out of sight or in the trunk and they should keep their cars locked." The Security Branch will be glad to assist any employees concerned with protecting their property, he said. For more information, call the Security Office at x4441.

EAA offers Astros tickets

The Employees Activities Association will begin selling tickets June 30 for the July 18 game between the Houston Astros and the New York Mets. The \$7.50 tickets include field level seats (which regularly are \$8.50) as well as a beer keg and soft drinks. A limited number of tickets are available and will be sold at the Bldg. 11 Exchange Store.

Armand Bayou star party is July 12

The public is invited to attend a star party from 8 to 10 p.m. July 12 at the Armand Bayou Nature Center. Aside from star gazing, the evening will include a movie and a lecture in the auditorium. The Nature Center is located at 8600 Bay Area Blvd., near the intersection of Bay Area and Red Bluff Rd. For more information, call the Nature Center at 474-2551 or Bill Williams at x4711.

Adults sought for space education work

The Houston-based Junior Astronaut Corps program is looking for a few good adults and/or interested sponsors to work with youngsters in the area on a space education and training effort. "The program will include a 'Space Camp' activity facility sponsored by various local industries," said RSOC engineer Allan Eldridge, who is helping coordinate the effort. "We would welcome the talent, gifts and imagination of any interested persons in the JSC community." For more information, call Eldridge at 486-0791.

Two astronauts to depart

Two veteran NASA astronauts each with two spaceflights to their credit have announced their resignation from the space agency to pursue other interests in consulting and private industry.

Astronaut Owen K. Garriott, Ph.D., leaves NASA and government service after more than 20 years at the Johnson Space Center, while James van Hoften, Ph.D., will resign from NASA to work for Bechtel.

Highlights of Garriott's career include a 2-month stay in space aboard Skylab, July 28 - Sept. 25, 1973, and the 10-day Spacelab 1 mission, Nov. 28 - Dec. 8, 1983, on the Space Shuttle *Columbia*.

Garriott's plans include consulting and an active role in space research.

Dr. van Hoften, 42, will work in the Defense and Space Organization of Bechtel of San Francisco. The



Owen K. Garriott



James van Hoften

exact date of his resignation has not been established but is expected to be this summer.

On each of his two Shuttle flights, van Hoften performed extravehicular activities to repair faulty satellites. On Mission 41-C, April 6-13, 1984, he and astronaut George D. Nelson repaired the Solar Maximum

Mission satellite and returned it to orbit. With astronaut William F. Fisher on Mission 51-I, Aug. 27 - Sept. 3, 1985, he performed on-orbit repair of SYNCOM IV-3.

Prior to joining NASA in 1978, van Hoften was an assistant professor of civil engineering at the University of Houston.

NASA cancels Shuttle Centaur

NASA has cancelled the Shuttle Centaur upper stage program.

Administrator James Fletcher made the decision June 19 after a high-level review conducted at NASA Headquarters. JSC Center Director Jesse W. Moore, along with Space Shuttle Program Manager Arnold Aldrich and several other NASA center directors, were in attendance at the meeting.

The decision will not affect other Centaur programs other than those which were planning to use the Shuttle.

"Although the Shuttle/Centaur decision was very difficult to make, it is the proper thing to do and this is the time to do it," Fletcher said. He also announced his intention to appoint a NASA committee to review the history of the Shuttle/Centaur program and the events leading to the June 19 cancellation of the program.

Fletcher also reaffirmed his commitment to the planetary science program and pledged to seek alternative solutions for payload launch capabilities "as quickly as possible."

The Agency has begun efforts, under the direction of Associate

Administrator for Space Flight Rear Admiral Richard H. Truly, to identify other payload options for the major NASA scientific and planetary payloads which were to have used Centaur.

NASA also will provide assistance to the Department of Defense as it examines alternatives for national security missions which had planned to use Centaur.

At the time of the 51-L accident, the Centaur was in the final months of preparation for the then-scheduled launches of the Galileo and Ulysses probes. The liquid-fueled upper stage had been scheduled to propel the spacecraft into Earth escape trajectories for their trips toward Jupiter in May.

Major safety reviews of the system were underway at that time, and these reviews were intensified in recent months to determine if the Centaur program should continue. "The final decision was made on the basis that even following certain modifications identified by the ongoing reviews, the resultant stage would not meet safety criteria being applied to other cargo or elements of the Space Shuttle system," a

Headquarters announcement said.

An independent study also was conducted by the surveys and investigations staff of the House Committee on Appropriations, Subcommittee on HUD-Independent Agencies. That study was provided to NASA recently by Chairman Edward P. Boland (D-Mass.) and Rep. William Green (R-N.Y.), the ranking minority member. The two concluded, based on the study, that the proper course was to terminate the Centaur system development and seek other alternatives.

At the Cape, work crews were busy this week performing integrated testing on the Orbiter *Atlantis*, which has been mated to an external tank and twin solid rocket boosters. The Orbiter had been scheduled for a rollout to Pad 39A June 26 for two months of ground testing in association with the Shuttle/Centaur system.

Since the vehicle was already stacked at the time of the Centaur cancellation, KSC elected to go ahead and perform the normal integrated tests between the flight elements. The Cape also plans to perform frequency response tests on the SRBs.

Society creates Resnik Medal

The Society of Women Engineers (SWE) has established a new medal in honor of the late Dr. Judith A. Resnik.

The medal, called the Resnik Challenger Medal, will be awarded annually to a female engineer for "visionary contributions to space exploration," said SWE President-Elect B. K. Krenzer.

Resnik was a member of the Society, and the medal is intended to honor her accomplishments in

the engineering field, and the accomplishments of others who follow, Krenzer said. "The medal will recognize obvious merit and significant contributions by an individual who has expanded the horizons of space exploration through engineering breakthroughs in aeronautical, astronautical, materials, electronic, structural and other fields of engineering," Krenzer said.

Those eligible for the award are women engineers who have been practicing for 10 or more years.

Applications will be accepted from the engineering community, Krenzer said, including technical societies, engineering industries, academia or government.

The establishment of the medal was formally announced June 25 at ceremonies in Hartford, CT, during the Society's annual meeting. The SWE also is developing a Resnik Scholarship fund. The address is SWE Headquarters, 345 E 47th St., New York, NY 10017.

RICIS

(Continued from page 1) environment. "This data base will be available through RICIS and will allow someone to develop a strategic plan before undertaking any kind of commercial space venture," McDonald said.

Other activities undertaken by RICIS include an expert system shell written in Ada. According to Robert Brown, Chief of the Technology Development and Applications Branch, Mission Planning and Analysis Division, this has never been done before. Brown also said RICIS will find the requirements for the next generation of expert systems as part of a program to evaluate the technology needed for the space transportation system up to the year 2020.

McDonald said he hopes RICIS will become a gateway to computer-science expertise in other institutions.

Gilruth Center News

Call x3594 for more information

Ladies weight training—This popular course begins July 14 and runs for 4 weeks. The class meets Mondays and Wednesdays from 7 to 8 p.m. The cost is \$20 per person.

Defensive driving—Learn to drive safely and qualify for a 10% reduction in your auto insurance for the next three years. This all day Saturday class meets from 8 a.m. to 5 p.m. July 19. Space is limited.

Jazzercise—Designed to develop total fitness, this four-week class meets Mondays and Wednesdays from 4:30 to 5:20 p.m. beginning July 7. The cost is \$25 per person.

Horseshoe tourney—The deadline for men's and women's singles entries in a horseshoe tournament is July 10. The tournament will be held from 11 a.m. to 4 p.m. in the picnic area. The entry fee is \$2 per person. Contact the Rec Center for details.

Guitar—Learn simple songs, chords and strums in this class which meets Wednesdays for 6 weeks beginning July 9. The class meets from 7 to 8 p.m. and the cost is \$25 per person.

New phone number—Softball game times, information on rain makeup games, and a listing of Rec Center classes are all available by calling the new code-a-phone at the Rec Center. The number is x3944.

Tennis leagues—Registration for summer tennis leagues concludes July 3, with league play beginning July 7. The cost is \$10 per person, and each player must furnish a can of tennis balls. The A League for men and women plays on Tuesdays, the B League plays on Wednesdays and the C League plays on Thursdays.

NASA
Lyndon B. Johnson Space Center

Space News Roundup



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Editor: [Name] Brian Welch

Ten years after Viking

The lure persists

By David Luhman

Ten years have passed since Viking I soft-landed on Mars and showed that only big rusty rocks and not little green men inhabit the Red Planet. The lure of that other world remains strong, and the likelihood of humans examining those rocks in person is greater than ever before.

As might be imagined, a decade has made a big difference in the outlook for sending people to retrace the route of the Vikings to Mars. The differences can be seen not only in the methods now suggested for piloted missions, but also in the politics and the level of discussion which accompany any suggestion that people go to Mars.

The True Believers, the ones who attended the Case for Mars studies in Boulder, Colorado, in the early 1980s and dubbed themselves "the Mars Underground," have in the past sometimes found themselves relegated to the ranks of the unrealistic by the rest of the space community. Now, however, they are finding themselves joined by policymakers, politicians and a Presidential commission.

The turning point came in 1984, according to the NASA report, "Manned Mars Mission," which was issued last month. "In 1984, three important factors modified the NASA planning environment," the report said. In that year, the Shuttle recorded some of its greatest successes, the President expressed strong support for the Space Station Program, and Congress passed legislation which created the National Commission on Space.

A variety of activities this year continue to focus attention on Mars. On the tenth anniversary of the Viking missions, NASA's Solar System Exploration Division will sponsor The Mars Conference July 21-23 in Washington, D.C. The conference will study the history of Mars exploration, review the status of programs like the Mars Observer probe and study the requirements for a piloted mission to Mars.

A few days before that conference begins, the Lunar and Planetary Institute and the National Air and Space Museum will sponsor a symposium called "Mars: Evolution of its Climate and Atmosphere," which will be held at the Hirshhorn Museum July 17-19.

The two conferences—and the Project Viking reunion at Langley Research Center on July 20—come on the heels of the report of the National Commission on Space, which urged the United States to undertake a program that would "support human settlements beyond Earth orbit, from the highlands of the Moon to the plains of Mars."

These kinds of studies have long called for renewed exploration of Mars to map resources and study the planet in more detail. Hardware is in the pipeline in both the United States and the Soviet Union to do just that. The Soviets announced, at the 1985 Lunar and Planetary Science Conference at JSC, their intention to send a probe to Phobos, one of the two moons of Mars, in 1988. The U.S. will follow with the Mars Observer probe, which will conduct a two-year orbital survey of the planet in the early 1990s.

With those developments as a foundation, researchers are placing emphasis on piloted Mars missions which has not been seen since late in the Apollo era.

A piloted Mars mission had impetus in the late 1960s as one of NASA's programs after Apollo. The program planned to use improved versions of the Saturn V to heft equipment into a low-Earth orbit (LEO), and an advanced Nuclear Thermal Rocket to propel people

to Mars by the late 1970s.

But the ambitious and expensive program was deferred in order to build the Space Shuttle and then the Space Station. Dr. Michael Duke, Chief of JSC's Solar System Exploration Division (SSED), said the Space Station was necessary for the planned Mars mission back in the late 1960s, and is still needed for any future mission to the Red Planet.

NASA would respond if asked to undertake such a project.

The study, in conjunction with the Los Alamos National Laboratories, began in 1984 and culminated in a June 1985 workshop at the Marshall Space Flight Center. Over 90 invited and contributed papers were presented, 28 participants from JSC attended, and the work of these papers was condensed into an 80 page report.

National Commission on Space called for a piloted Mars mission by 2015. But before reaching for Mars, the Commission recommended that a lunar outpost be established by 2005.

A lunar base may initially seem to detract from any kind of Mars mission, but Dr. Wendell Mendell, a senior scientist in SSED and editor of the new book *Lunar Bases and Space Activities of the 21st*

resources, Mendell said. He also said that a more complex transportation network between the Earth and the Moon is needed, but this network could serve as a lunar base and other activities as well as a piloted mission to Mars.

Mendell cautioned, however, that the second approach also requires a long-term commitment to space.

Because a lunar colony would serve as a stepping stone to Mars and other destinations, Mendell said the idea of a lunar base has "moved from being an irresponsible dream to a conservative way to explore the solar system."

A lunar colony could serve not only as a stepping stone to other worlds, but also as a point of supply for future missions. "By utilizing the Moon's resources, one avoids fighting the Earth's atmosphere and gravity—which is six times that of the Moon's," Mendell said.

One primary and valuable resource which the Moon could provide for future missions is liquid oxygen for propulsion. Mendell said up to half of the Moon's mass is made up of oxygen, and oxygen can be extracted from ilmenite, a mineral found on the Moon.

Although existing technology can produce oxygen from lunar material, Mendell said the big question is whether it is cheaper to produce this oxygen on the Moon or to ship it up from the Earth. According to Barney Roberts of the Advanced Programs Office, Engineering Directorate, once a lunar base is established, liquid oxygen from the Moon can be placed in LEO for one third the price of transporting up from the Earth.

However, the initial cost of the lunar base would have to be spread out in order to keep the overall price of lunar oxygen below that for Earth oxygen. Mendell said he sees two projects which may increase space activity to the point where a lunar base makes economic sense: the Strategic Defense Initiative or a piloted mission to Mars. In this line of thinking, a mission to Mars becomes a conservative and less expensive step after a lunar base is established. Roberts agreed that a mission to Mars would best be thought of as being coupled to a lunar base.

Roberts said using locations like the Moon as points of resupply is the only means to extensively explore the Solar System. "If we don't cut the umbilical cord with the Earth, future space exploration will be limited and expensive," Roberts said. Using the exploration of the American west as an analogy, Roberts said that Phil Garrison of the Jet Propulsion Laboratory showed that the western boundary of the United States would be the Appalachians if explorers did not live off the land. "If pioneers of the 18th and 19th centuries had carried all their consumables in a wagon, they could travel only 100 miles before they would have to turn back, and they'd have to eat their mules on the way back," Roberts said.

By utilizing extraterrestrial materials available at places like the Moon and the Martian moons of Phobos and Deimos where liquid hydrogen and liquid oxygen can be made, the Solar System can be explored extensively and cheaply, many researchers believe. And with the growing support of national policymakers, they are laying the groundwork for that effort.

Luhman, a cooperative education student from the University of Colorado at Boulder, is working on a unique double major—aerospace engineering and journalism—and will be writing for the *Space News Roundup* this summer.



Artist's concept of a proposed Mars base which includes a "wagon-train" rover vehicle, berm habitation modules buried under Martian soil, greenhouses, water well drilling rig and an unmanned airplane. (Artwork courtesy of Pat Rawlings, Eagle Engineering.)

Because of the expense and logistics associated with an interplanetary mission, a growing number of space scientists believe the only way to explore the Solar System on a long-term basis is to live off the planets as we explore them.

And the manned exploration of other planets advocated by organizers of the Mars Conference is more than just idle talk for many people like former astronaut and New Mexico Senator Harrison "Jack" Schmitt. Schmitt predicted that the Soviet Union plans a manned fly-by of Mars in 1992 to coincide with the 75th anniversary of the Russian Revolution. Schmitt would like to see the United States beat the Soviets to Mars for political reasons and to promote the study of math and science.

Schmitt's concern was great enough to prompt then NASA Administrator James M. Beggs to direct NASA centers to study a piloted mission to Mars. Beggs called for a study to answer how

The report attempted to find ways to meet the two basic requirements—habitation and transportation—for a piloted Mars mission. The report suggests that a new philosophy should be applied to space exploration if Mars is to be efficiently explored on a long-term basis.

For example, the report urges that aerobraking be considered for slowing spacecraft as they arrive at Mars and upon their return to Earth. Also, the report states, "The production of propellants on the Earth's Moon, on Phobos/Deimos, or on Mars potentially can provide very large performance benefits."

Report writers estimate an initial mission to Mars could be accomplished by the year 2000 for some \$30-40 billion. This, according to the report, "amounts to about half of the cost of the Apollo program which took place when the U.S. Gross National Product was one-third as large as it is now."

Although a piloted mission to Mars may not come as early as the year 2000, such a program has received high-level support. The

Century, said there are two ways to approach a manned Mars mission.

Mendell said the first approach begins the mission in LEO by hauling 1.5 million pounds of fuel and equipment to a staging point. It will take over a year simply to fuel the vehicle, and the mission will only have a two-week launch window in which to reach Mars from LEO.

The second approach utilizes Lagrange libration points. According to Mendell, these points in a gravitational field where, for example, the gravitational force from the Earth is cancelled by the force from the Moon, can be used as transportation nodes. From there, the gravity field of the Earth could be used to advantage by swinging past the planet to assist space vehicles on their way to Mars, much like Voyager used gravity assisted trajectories to explore the Solar System.

This second approach does not have the launch-window constraints of the first option, and offers a much better chance to use lunar

Cookin' in the Cafeteria

Week of June 30 — July 4, 1986

Monday — Beef & Barley Soup; Beef Chop Suey, Breaded Veal Cutlet w/Cream Gravy, Grilled Ham Steak, Wieners w/Baked Beans (Special); Buttered Rice, Brussels Sprouts, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Celery Soup; Fried Shrimp, Pork Chop w/Applesauce, Turkey a la King, Pepper Steak (Special); Au Gratin Potatoes, Breaded Squash, Buttered Spinach.

Wednesday — Seafood Gumbo; Fried Catfish w/Hush Puppies, Braised Beef Ribs, Mexican Dinner (Special); Spanish Rice, Ranch Beans, Buttered Peas.

Thursday — Green Split Pea Soup; Corned Beef w/Cabbage & New Potatoes, Chicken & Dumplings, Tamales w/Chili, Hamburger Steak w/Onion Gravy (Special); Navy Beans, Buttered Cabbage, Green Beans.

Friday — Independence Day Holiday.

Week of July 7 — 11, 1986

Monday — French Onion Soup; BBQ Sliced Beef, Parmesan Steak, Spare Rib w/Kraut, Chili & Macaroni (Special); Ranch Style Beans, English Peas, Mustard Greens. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Split Pea Soup; Meatballs & Spaghetti, Liver & Onions, Baked Ham w/Sauce, Corned Beef Hash (Special); Buttered Cabbage, Cream Style Corn, Whipped Potatoes.

Wednesday — Seafood Gumbo; Cheese Enchiladas, Roast Pork w/Dressing, BBQ Link (Special); Pinto Beans, Spanish Rice, Turnip Greens.

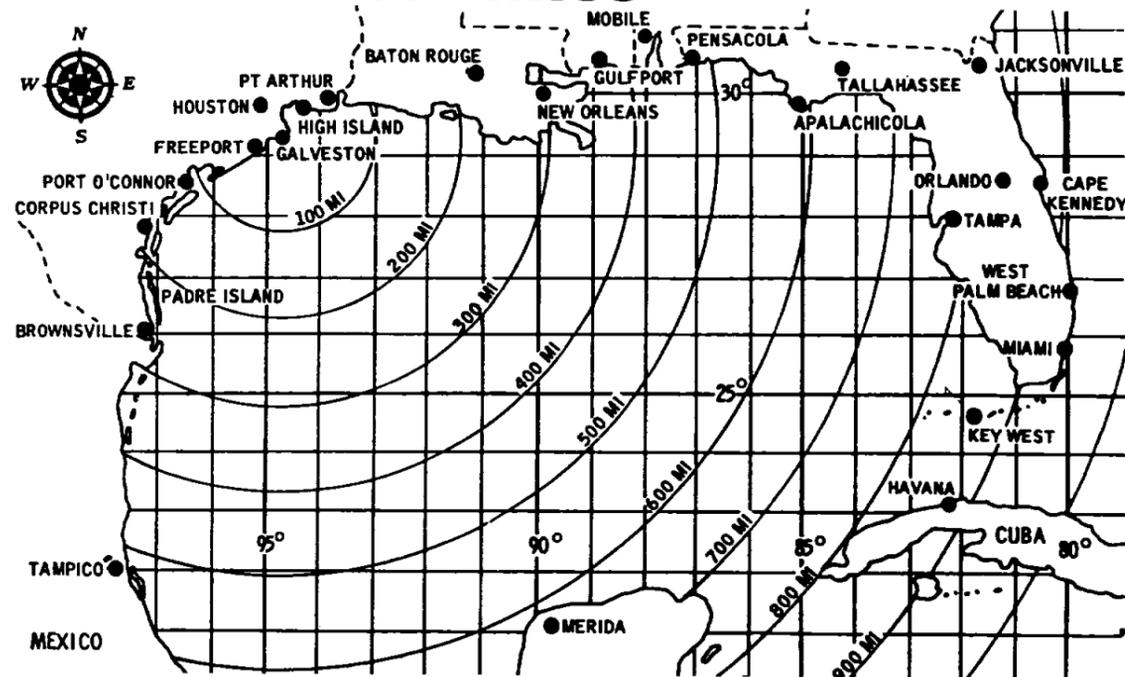
Thursday — Beef & Barley Soup; Roast Beef w/Dressing, Fried Perch, Chopped Sirloin, Chicken Fried Steak (Special); Whipped Potatoes, Peas & Carrots, Buttered Squash.

Friday — Seafood Gumbo; Fried Shrimp, Baked Fish, Beef Stroganoff, Fried Chicken (Special); Okra & Tomatoes, Buttered Broccoli, Carrots in Cream Sauce.

AT BUILDING #3

On Wednesday we feature The Reuben: Corned Brisket, Swiss Cheese on a bed of Sauerkraut, Poupon Mustard on Rye and 1/4 Pickle. Delicious! Monday and Thursday check out our French Dip Sandwich.

Bonnie's near miss



In light of the events of June 25 and 26, this hurricane tracking chart may be useful.

(Continued from page 1)

preparations revolve around readying the different computer complexes for the possible loss of power. "We don't want to lose the central plant and have it go down hard," McCright said. "In areas like Bldgs. 5, 30 and 35, we began warming up the air in the computer areas and had the operators save data in the memories and perform the other functions that make a restart easier."

McCright stressed that the teams need at least four to six hours to do their jobs, and that employees can be of great help by taking steps to secure their offices. "There's just no way we can save every office on site," he said. "We really rely on the employees to help us with that."

Those preparations include unplugging electrical appliances and office equipment, securing sensitive documents, raising venetian blinds, and closing (but not locking) office

doors before leaving. McCright also suggested that computer terminals near windows be either moved or covered with plastic.

When a hurricane does strike, JSC policy is that normal work activities will resume at the beginning of the next work day, unless employees are otherwise notified through the news media. Employees also can call 483-3351 for recorded messages on the status of the Center.

Roundup Swap Shop

All Swap Shop ads must be submitted on a JSC Form 1452. The forms may be obtained from the Forms Office. Deadline for submitting ads is 5 p.m. the first Wednesday after the date of publication. Send ads to Roundup, AP3, or deliver them to the Newsroom, Bldg. 2 Annex, Room 147. No phone in ads will be taken.

Property & Rentals

Sale: 60x95 unimproved corner lot on Town of Holiday Lakes, Angleton, Brazoria County, \$1,000. Brenda, x5085 or 996-9738.

Lease: Meadowgreen, CLC, clean & bright 4-2-2, new paint, all brick, fpl, formals, mini-blinds, cable, pool & tennis, \$750/mo. 280-8796.

Sale: Pipers Meadow 3-2-2, fenced, fpl, very neat, 16023 Windom, large rooms, \$75,000. Sam Jo 488-9742 or 483-4612.

Sale: Kings Row townhome, 3-2.5, 1+1, tiled entry & baths, deck overlooks pool, fpl. \$5,000 takes over FHA 10.5 no approval loan. 333-2636.

Sale: house at 703 Reynolds, League City, 3-1.5-2, new carpet, mini-blinds, cimmaron shades, convenient to school & shopping. 554-2317.

Lease: League City Countryside, very nice 4-2-2 for family. Tim, x2375 or 486-9318.

Lease: El Dorado Trace condo, 2-2, W/D, refrig., fpl. Tim, x2375 or 486-9318.

Lease: 1/1 condo, 14 min. to NASA, by College of the Mainland, pvt. parking, fpl., carpeted, mini-blinds & drapes, covered balcony, major appliances, some furn., \$399. Valerie, x2208 or (409) 935-1149.

Lease: 3-2-2 home, south loop near Gulfgate, close to UH/Downtown, Med. Center, central AC/H, hardwood/ceramic tile floors, gourmet kitchen, available Aug. 1, \$550/mo. Harry, x4571.

Sale: Lake front Toledo Bend, 2 br. loft, beautiful lot, \$45,000. M. Lillpop, 864-8679 evenings.

Sale: Toledo Bend 2 story, central AC/H, 3-2, fpl., surrounding deck, waterfront, \$69,900. M. Lillpop, 864-8679.

Lease: Lake Livingston waterfront house, 3-2, fully furnished, pier, exc. fishing, skiing, swimming, weekend and weekly rates. 482-1582.

Lease/sale: Heritage Park 3-2-2, all electric, 1450 sq. ft., fenced, fans, cul-de-sac, near park & pool, \$515/mo. Mike, 280-1714 or 554-4172.

Sale: Memorial Point Lake Livingston lakeview lot, near pool, tennis, restaurant, paved streets, sewer/water, elec., 24 hr. security, below assessed value. 946-3945.

Lease: Heritage Park/Friendswood, new section, 3-2-2, formal dining, fence, fpl., microwave, clean, option to buy, \$575/mo. 482-6609.

Lease: Friendswood/Forest Bend, 3-2-2, fence, patio, good loc., refrig., \$525/mo. 482-6609.

Sale: Pearland 3-2-2, beaut. cond., drapes, curtains, mini-blinds, assume 10.5% FHA or get new loan, no equity asked, \$74,500. 485-0076.

Lease/Sale: Baywind I 2-1.5-2, W/D, furnished, \$430/mo., sell for appraised. 333-3992.

Sale: Residential lots in Green Acres

off NASA Rd. 1. Each lot 114 x 185, \$12,000. 324-4946.

Rent: University Green Townhouse 3-2.5-2, pool & tennis, large yard, pets OK, \$695/mo. 474-5079.

Sale: Friendswood/Forest Bend, townhouse, 3-2.5, LR, den, lost of storage space, park, pool, \$49,500. 333-2322.

Galveston Canal front lot, Isla Del Sol lot #32, cement bulkhead, 8' deep canal, beautiful view. 642-2026 or 484-4198.

Cars & Trucks

'85 300ZX 2+2, silver, digital super-sonic sound system, velour interior, 9,800 mi., \$16,000. 554-2317.

'78 VW Rabbit deluxe, 4-speed, AC, AM/FM/cassette, rear defog, \$1,100 OBO. Tom x3831 or 482-2425.

'50 MGTD, totally restored, red, leather, 500 mi. since restoring, runs exc., extras, \$12,600. Gerlach, 482-5825 or x2491.

'79 Dodge Omni hatchback, 4-speed, AC, clean, white with black louvers. Morton, 326-3225 or x2753.

'77 Camaro, red, AM/FM, PS, PB, must sell, \$1,800 OBO. Cheryl, x5161 or 334-1303.

'77 Buick LeSabre, AC, AM/FM, recent valve job, runs well, must sell, \$1,850. Bob, x3582 or 472-2163.

'85 Chevette, 2-door, exc. cond., refinance, take over payments. Ethel, x5341, or Deb, 484-9080.

About submissions ...

Civil Service and contractor employees interested in advertising in the Roundup Swap Shop are reminded that submissions must be placed on a JSC Form 1452, available from the Forms Office, Distribution Operations. The one group excepted from this rule is NASA retirees, who may submit the ads as always, preferably on an 8 1/2 x 11 sheet of paper. For all other advertisers, a Form 1452 is necessary, and can be obtained through normal requisition procedures. The cooperation of our advertisers in following these guidelines is greatly appreciated.

'79 Thunderbird, loaded, v.g. cond., 67,000 mi., \$2,200. 482-3989.

'83 Toyota Corolla, 2 dr., white, auto trans. w/overdrive, PS, AM/FM, clean, \$5,100. 333-2717.

'68 Dodge Dart, 4 dr., power, runs good, \$550. Wanda, x2032, 474-5079.

'76 Buick Elec., 4 dr., needs work; '79 Buick LeSabre; '80 Buick Elec., 2 dr.,

good cond., ask about package deal. Joanne Fink, 333-4494.

'73 MGB, good cond., removable hard top. 532-1659.

'85 Firebird, fully loaded, T-top, metallic gray, ex. cond., \$10,500. (409) 986-7177.

'78 Granada, AC, PS, PB, auto, good cond., 62,000 mi., \$2,100. 488-3208.

'79 Pontiac Bonneville, AC, AM/FM, ex. cond., rustproofing, polyglycoat, one owner, 66,500 mi., \$3,200. 337-3961.

'67 Mustang, good cond., AM/FM/cass., new alt., water pump, brake job, \$2,400 OBO. 333-9565 or 538-4327.

'70 Olds Cutlass, runs well but needs some work, \$250. Wade, x4179.

'84 Z 28, 5.0 OH, white/blue, loaded, warranty, alarm, T-top, new tires, low miles, \$10,500 OBO. Beth Ann, 333-6616 or 996-9396.

'74 Fiat Spyder, unfinished project, alloy wheels, new paint, top, carpet, battery, needs engine, \$650. 333-0813 or 996-9715.

'70 Chevy pickup, 6 cyl., std., new paint, ex. work veh., \$1,150 OBO. Steve, 6128.

Boats & Planes

18' catamaran AMF Trac sailboat with trailer & extras, like new. \$3,950. 333-3056.

50' boat slip at The Wharf, \$100/mo. Bill Armstrong, 757-2917 or 465-0807.

Trolling motor, Pelveger model M-30, 3-speed, forward/reverse, six or twelve volts, 12 lb. thrust, good cond., \$65 OBO. 486-4378.

22' Mustang sailboat with outboard motor, ex. cond. Kit Michels, x5934.

Buccaneer 20 ft., 3 sails & spinnaker and gear, 4 hp. Mercury, Porta Potti, E-Z load trailer, \$4,500. 641-2026 or 484-4198.

Ski boat with trailer, 14 ft., 90 hp. ob., needs minor work. \$550. 483-3749.

NOMAN ultralight aircraft and fully enclosed trailer call for details. 480-6431.

17' Folboat Super folding canoe, complete w/ cases and instructions, \$300. 470-1306.

14' Hobie catamaran, trailer, new sail and trampoline, \$1,200. Chuck, 482-1859.

RVs

Winnebago class A motor home, generator, self-contained, 65,000 miles, very good cond., \$5,450. 488-8105 or x4606.

Cycles

'78 Kawasaki KZ650, 5,543 miles, fairing plus others, exc. cond., \$1,400 OBO. Handley, x3725 or (409) 345-5495.

Motorcycle accessories: helmet, boots, gloves, leather jacket and snowmobile suit. Brad, x4687 or 338-1252.

'82 Honda XL 80 S, street legal, less than 1,000 mi., ex. cond., \$425. Cheryl, x5161 or 334-1303.

'81 Yamaha 650 Maxim, shaft drive, fairing, stereo, luggage rack, 7,900 mi. Frank, x4356 or 482-1633.

Audiovisual & Computers

C 128, disk drive, 2 joysticks, disks and word processing, used 3 hrs., \$450. Frank, x4905 or 941-8356.

Video camera, JVC (GNX-7U) w/ character gen., case, uni/omni mike, filters, new \$1,100 now \$850. Underhill, x2138 or 326-1303.

Household

Sale: Kenmark fine china service for 8, never used, white with single pink rose, all serving pieces, \$250 OBO. 333-2636.

Sale: Black leather overstuffed recliner w/ ottoman, \$30. Old desk, \$25. Dresser/desk type, \$20. Old Nat. Geo. graphics, \$10. Roller skates, \$10. Brenda, x5085 or 996-9738.

Brass Victorian chandeliers, antique, one appraised at \$500, one appraised at \$600, negotiable. David, 480-1867.

Electric dryer, water conditioner, 1979 Monte Carlo wire wheel covers, Bundy 577 clarinet (exc. cond.), washer - large cap. Ethel, x5341.

Antique small china cabinet and buffet, \$475 for both; Cypress electric wall clock, \$25; antique school desk, \$35; typing table, \$20; 2 metal file cabinets, \$20 for both. 488-5564.

Tomlinson tailored chestnut sofa; Drexel pecan lamp/coffee table; Hickory celery arm chair, all in ex. cond. Connie, x5565 or 333-2271.

Single "longjohn" mattress and box-springs, good for college students, \$20. Merri, x5425 or 532-1318.

Sears 17 cu. ft. upright freezer, frost free, coppertone, ex. cond., best offer over \$100. 488-4487.

New loveseat and matching chair, cost \$1,250, sell for \$275; antique footstool, \$35; two kitchen chairs, \$25 for pair; office table, \$22.50; 2 file cabinets, \$45 for both. 488-5564.

California Coopage portable 6 place spa, sand color. 488-2316.

Carrier air compressor, commercial 10 ton unit, great cond., all lines sealed, \$500. Joe, x4905.

Moving sale: Kingsize waterbed, Queensize BR set, dining table, 4 chairs, freezer, color TV, credenza, chairs, lamps, pictures, linens, dishes, \$2,000 for all or sell indiv. 486-4218.

Sofa bed, \$90; comfortable chair, \$25. Marilyn, x5475.

Sears Kenmore washer, heavy duty, all cycles, 7 mo. old, warranty, \$310. 524-3018, 484-8057.

Rattan dining table & chairs, \$95; Dodge van passenger seats, \$150; rattan sofa & 2 chairs, \$125; 4-chair dinette,

\$25; twin box spring, \$10. Mike, 280-1714 or 554-4172.

Antiques: hump-back trunk, \$95; wardrobe/chest combo, \$1,200; small curio cabinet, \$150; 15 piece cannister set, six large, six small, wine, vinegar, salt, \$195. Harry, x4571.

Wanted

Non-smoking car pooler, Spring TX to JSC, 7:15-3:15 hours. Roy Parker, x2566, Panna, x2213, or Pat, x5711.

Fourth, non-smoking carpool member for existing carpool, Edgebrook area to JSC, 7:30 to 4:00. Charles, x4721.

Handgun in good cond. 480-6431.

Pets

Buff colored cocker spaniel, male, 3 yrs. old, no papers, \$30. 944-6457.

Hamster (teddy bear) and Habitatrail cage with exercise wheel, \$25. 944-6457.

Female cat free to good home, all shots, 1.5 yrs. old. Chris, 750-1087 or 486-7009.

Musical Instruments

Roland GR-700 guitar-guitar synthesizer with 505 (strat style) controller, completely programmable, holds 64 programs, save or load others from tape, orig. \$3,000, \$2,000. Carl, 280-8227 or 486-2195.

Miscellaneous

Go-cart, 8 hp Dingo, exc. cond., new cost \$1,200+, sell \$650. Handley, x3725 or (409) 345-5495.

MF 50 tractor, 6 ft. tandem disc, 2 bottom plow, planter, trailer, 5 ft. box blade all for \$5,250. 488-8105 or x4606.

Weight bench with leg attachment, 117 lb. weight set. 486-5454.

TI-99/A word processing package, three available, still sealed and never used, \$30 each. Herman Lyle, x4528.

Ventilation turbine with roof jack, 12 in. dia., new bearings, \$10. Bauch, 333-3382.

Two Sears riding lawnmowers, 26" cut with owner's manual, one runs, one does not, \$150. 482-4239.

Pool table, 3 piece slate, \$300. Danley, x3749.

York weight set, two sets of dumbbells, EZ curl, boots, bench, belt, over 200 lb. in plates, no pieces, \$220. Rich, 486-4454.

Insulated, paneled cover for '81 Toyota or similar, long bed, \$275; Baja kit part, \$35; VW exhaust extractor, \$50 OBO on all the above. Underhill, x2138 or 326-1303.

19.5 yr. Playboy magazine collection, \$250. Frank, x4905 or 941-8356.

Swing set, 9' galvanized, sturdy, \$200. Wade, x4179.

Beautiful practice piano, \$300. Marilyn, x5475.